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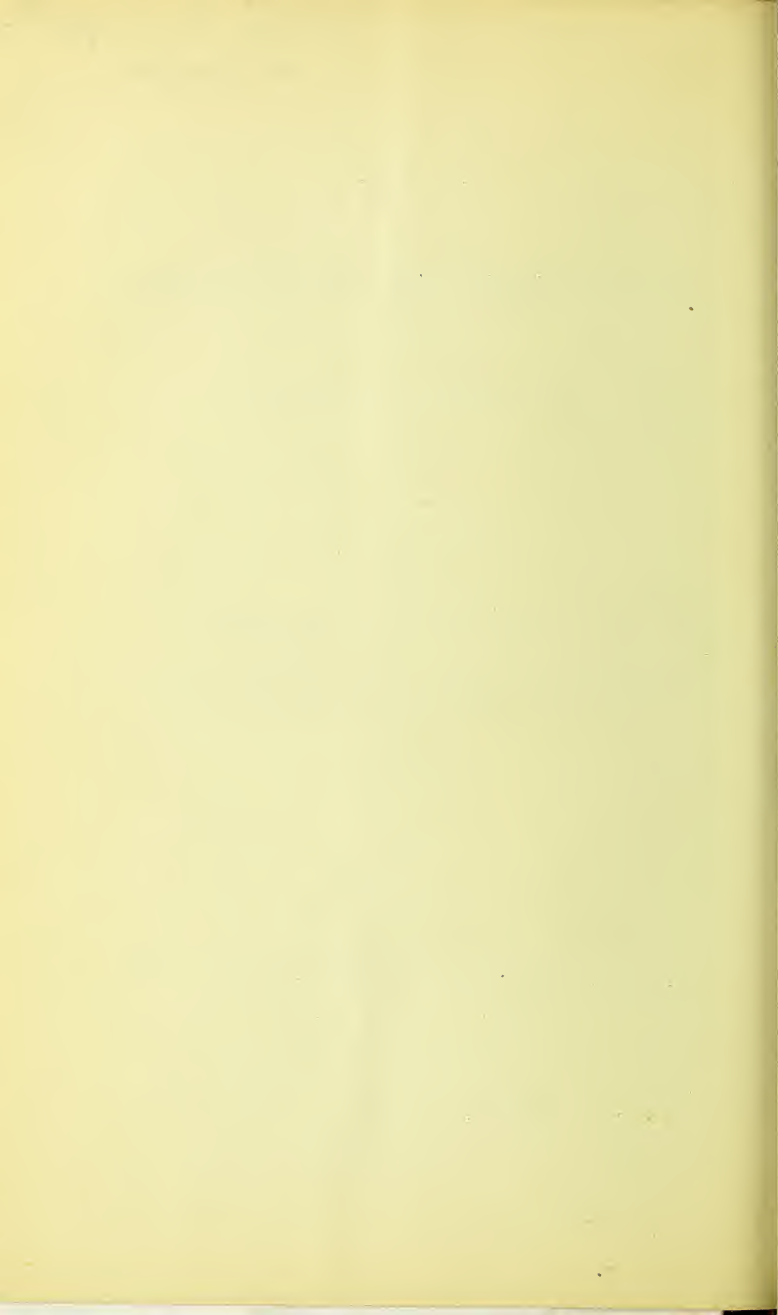
ON THE
TREATMENT OF PNEUMONIA
BY THE ICE-BAG.

BY

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FOUR YEARS ago I published in the *British Medical Journal* (July 11th, 1885) an account of "Two Cases of Broncho-pneumonia Treated with Bleeding and Ice." I was much impressed with the good results that in each of these cases followed, and appeared to be due to, the persistent application of an ice-bag to the chest wall over the inflamed lung. Since that time I have taken such opportunities as have occurred to me of testing the use of the ice-bag in cases of pneumonia, and my impression of its value and of its great superiority to poultices and other warm applications has been so greatly strengthened, that two years ago I mentioned the matter to some of my friends who have large opportunities of clinical observation in hospitals and elsewhere, and asked them to give the ice-bag a fair trial. Several physicians have been good enough to comply with my request. If their opinion of this method of treatment prove to be as favourable as my own, practitioners of medicine generally may be encouraged to employ it, and by a sort of informal collective investigation it will then stand or fall.

¹ A paper read before the Harveian Society, Oct. 17th, 1889.

It can only be by the careful observation of a large number of individual cases that a satisfactory demonstration of its value can be obtained ; for pneumonia is pre-eminently a disease in which it is easy to arrive at false conclusions with regard to the effect of treatment. The remarkable "crisis" which usually marks the close of a pneumonia is a trap for the unwary therapist, and any remedy the employment of which has preceded this striking event is only too likely to be credited with having produced it. And the fact that the crisis may occur at any period of the disease, from the third day to the tenth, makes it specially difficult to be sure that an apparent cutting short of the pyrexial process may not be simply the natural course of its development. To this deceptiveness of clinical experience is no doubt largely due the remarkable variation in medical opinion about the proper treatment of pneumonia. And the difficulty of correct inference is greatly increased by the fact that a condition so alarming in its appearance when at its height nevertheless usually recovers completely when the patients are children or young adults, except under special circumstances. Too often has the natural course of the disease appeared to give proof of the efficacy of some particular line of treatment, and venesection, leeches, tartar emetic, aconite, veratrine, digitalis, quinine, and alcohol have each in turn had their enthusiastic advocates. In advocating the employment of the icebag in pneumonia I am desirous of bearing these fallacies in mind.

The use of cold applications to the chest in pneumonia was advocated twenty years ago by Niemeyer. He used, however, not the ice-bag, but cold compresses, which are certainly far inferior to the ice-bag, through their tendency to become warm, and the necessity they entail of frequent disturbance

of the patient. Niemeyer says: "I have made extensive employment of cold in the treatment of pneumonia, and, relying upon a large number of very favourable results, can recommend this procedure. In all cases I cover the chest of the patient, and the affected side in particular, with cloths which have been dipped in cold water and well wrung out. The compresses must be repeated every five minutes. Unpleasant as this procedure is in almost all cases, yet even after a few hours the patients assure me that they feel a material relief. The pain, the dyspnœa, and often the frequency of the pulse, are reduced. Sometimes the temperature goes down an entire degree. My patients often retain this surprising condition of improvement throughout the entire duration of the attack, so that their outward symptoms would hardly lead one to imagine the grave internal disorder. The relatives of the patient, too, who do not fail to perceive the improvement, now readily assist in the treatment to which at first they were opposed. In a few cases, and only in a few, the use of cold affords no relief, and the troublesome manipulation for its application increases the distress of the sufferers so much that they refuse to keep it up. In such cases I have not insisted upon the further application of cold. In the hospital at Prague every pneumonia is treated with cold compresses, and, according to the statements of Smoler, it is exceptional for a patient not to feel material relief from this treatment. As, however, I have never succeeded in cutting short a pneumonia by means of cold applications, I should only ascribe a palliative influence to their use, had not the duration of the disease in many instances been decidedly shortened and the convalescence hastened by means of their energetic and methodical employment. In fact, in but few cases have we seen the

disease delay its departure until the seventh day. Many have improved on the fifth, and a very large number as early as the third day; nay, I have repeatedly found it impossible to keep patients with recent pneumonia in hospital for a longer period than a week." This quotation from Niemeyer (vol. i., p. 185) bears striking testimony to the benefits obtained from the use of cold compresses frequently renewed, while acknowledging the drawbacks inseparable from their use.

My observation of the effects of the ice-bag has satisfied me that we may by it obtain still more striking benefit without these drawbacks. The ice-bag retains its cold until all the ice in it is melted; hence it produces a much more powerful local impression, and a fall of temperature considerably larger than the "entire degree" of which Niemeyer speaks, while the much less frequent disturbance of the patient and the freedom from wetting of the surface remove entirely the objections to which he refers. I have found that the presence of the ice-bag is usually pleasant to the patient, and I have never met with any decided objection to its use, even in children. Only occasionally where delirium has been present has the ice-bag been thrown off.

I will now briefly relate my experience of this method of treatment, and will classify the cases according to the apparent effect.

A. CASES IN WHICH IMMEDIATE AND FINAL ARREST OF THE PYREXIAL PROCESS FOLLOWED THE APPLICATION OF THE ICE-BAG.

Case 1.—William W——, aged twenty-five, was admitted into St. Mary's Hospital on the evening of Nov. 15th, 1887, with a temperature of 104°, which fell next morning to

normal, but had again risen when I saw him in the afternoon to $104^{\circ}8'$. There was limited pleuro-pneumonia at the right base, skin burning, herpes round the mouth. Pulse 120; respiration 36. This was apparently the fifth day of the disease, he having shivered on Nov. 12th, and again on the 13th. The affected side was tightly strapped, and an ice-bag applied over the strapping. The temperature fell immediately, and next morning was normal, when the ice-bag was removed; the pulse was 90, and respiration 24. After this the temperature was subnormal. Clearly the crisis had occurred, and whether or not the ice-bag had hastened it must be a matter of opinion. Possibly it may have been simply a coincidence.

Case 2.—John P——, aged twenty-six, admitted on June 18th, 1887, with a temperature of 104° , and a limited area of dulness at the left posterior base, pulse 120, respiration 24, on the fifth day of his illness, shivering having occurred on June 14th. The temperature continued about 104° , until I saw him on the seventh day, when an ice-bag was applied over the inflamed lung. During the following night the temperature fell until it reached 99° , when the ice-bag was removed. A rise of one degree followed, but next morning (ninth day) the temperature was normal, and so continued. Here, again, the apparent result from the ice-bag may have been a mere coincidence.

Case 3.—Maurice W——, aged sixteen, seen at Uppingham school, with Mr. T. Bell, in February, 1886, on the fourth day of his illness. The temperature was 104° , and there was moderate consolidation at the right base, with viscid, rusty sputum. No ice was obtainable, but snow was lying on the ground. Sponge-bags filled with snow were placed over the inflamed lung. The temperature fell at once (fifth day), and did not again rise. Once more we

must remark that the apparent effect may possibly have been nothing more than a coincidence. This, however, was certainly not so in Case 4, the subject of which was my own youngest child, aged three years. He had suffered from catarrh for two or three days, when he rapidly became acutely ill; the temperature ran up to 104° , the breathing was very rapid, and his lips began to look a little dusky. Just the faintest impairment of resonance was to be detected at the base of one lung. He passed a most restless night, and in the morning was no better. Some ice was sent for, and an ice-bag applied to the suspected area. Within twenty minutes of its application a distinct change for the better was observed. The breathing became much quieter. The temperature fell at once. In a few hours he was quite out of danger, and in a day or two was quite well. I am convinced that an attack of broncho-pneumonic was cut short.

Case 5.—In December, 1886, I was asked by a friend, a well-known physician, to see his little boy, aged four years. After a week's catarrh, the boy's temperature had suddenly risen to 104.5° ; pulse 140; respiration 50, occasionally interrupted by a short cough. The cheeks were a little dusky. I found a shade of loss of resonance at the left base below the angle of the scapula. At this spot, and also at the corresponding spot on the other side of the chest, inspiration was a little harsh, and attended by a little râle, and expiration was too plain. It was clear that broncho-pneumonia was just commencing. An ice-bag was applied to the back of the chest, and immediate recovery followed, the improvement being remarkably rapid. In this case, as in that of my own child, I have no doubt that the pneumonic process was strangled at its birth.

B. CASES IN WHICH IMMEDIATE ARREST OF THE PYREXIAL PROCESS FOLLOWED THE APPLICATION OF THE ICE-BAG, AND A RELAPSE FOLLOWED ITS REMOVAL.

Case 6.—Jenny McN——, a girl of about four years old, in the Highgate convalescent branch of the Children's Hospital, was found one day to have a temperature of 104°. I saw her next day, and found that there were dulness and bronchial breathing over part of the lower lobe of the right lung, with a hot burning skin and temperature still 104°. An ice-bag was at once applied over the affected lung, and within a few hours the temperature fell to 98°. The ice was then removed. The temperature immediately rose again, but did not pass 101°. It continued at this lower level for about thirty-six hours, and then suddenly fell to 96·5° and remained subnormal. The day after this fall examination showed that both dulness and bronchial breathing had completely vanished. In this case the immediate fall of six degrees which followed the application of the ice was clearly not the crisis, for on removal of the ice pyrexia recurred (though to a much less extent) and continued for thirty-six hours before the final drop.

Case 7. Caroline S——, aged thirty-eight, was admitted into St. Mary's Hospital on Jan 7th, 1889, and I saw her next day, the fourth of her illness, a rigor having occurred during the evening of Jan. 4th. The temperature was 103°, pulse 128, respiration 44. Dulness and tubular breathing were present over the left axillary base. She was slightly jaundiced. An ice-bag was applied at 3 P.M. At midnight the temperature had fallen to 99·6°, and the bag was removed. Immediately the temperature again rose, at 10 A.M. of the next (the fifth) day it stood at 101·5°, and at 6 P.M. at 104°, actually a degree higher than before the application of the

ice. It then began to descend in a leisurely fashion, reaching $100\cdot5^{\circ}$ by the evening of the sixth day, $99\cdot2^{\circ}$ on the seventh evening, 99° on the eighth, and $98\cdot4^{\circ}$ on the ninth. Thus there was no marked crisis at all, and the recurrence of the pyrexia after the removal of the ice clearly proved that the process was not yet over, and that the sudden drop of $3\cdot5^{\circ}$ in nine hours which accompanied the use of the ice was certainly due to it.

C. CASES IN WHICH IMMEDIATE ARREST OF THE PYREXIA FOLLOWED THE USE OF THE ICE-BAG, A RELAPSE FOLLOWED ITS REMOVAL, AND A SECOND FALL OCCURRED WHEN THE ICE WAS REAPPLIED.

Case 8.—Thomas C—, aged nine, was admitted into St. Mary's Hospital on July 14th, 1887, with pleuro-pneumonia of the left base. He had been caught in the rain on July 9th, felt ill on the 10th, but went to school on the 11th and 12th; pain in his side commenced on the 13th. On admission his temperature was 103° , pulse 128, respiration 48. An ice-bag was immediately applied, and the temperature fell moderately quickly, reaching $99\cdot4^{\circ}$ thirty-six hours later, when the ice was removed. At once an upward movement of temperature began, and in eight hours it had risen to 104° . Again the ice was applied, and again the temperature descended, but more rapidly than before, reaching $98\cdot4^{\circ}$ in sixteen hours more, after which it did not again rise above 100° . This terminal crisis occurred on the fifth day, reckoning from the initial pain. The more gradual fall of $3\cdot5^{\circ}$ which followed the first application of the ice was clearly due to it, as was shown by the relapse which followed its removal.

Case 9.—Henry B—, aged twenty-six, was admitted into St. Mary's Hospital on June 24th, 1887, on the second day of

a pneumonia of the left base, several rigors having occurred on the morning of the previous day. I saw him on the third day; his temperature was then 103° , pulse 116, respiration 32; physical signs limited, but characteristic. An ice-bag was applied, and the temperature fell promptly to 97.6° on the morning of the fourth day. The ice was removed, and the temperature rose at once; when it reached 100° the ice-bag was replaced. The rise, however, continued as far as 102° , from which it fell again to normal on the fifth day. Here the beneficial action of the ice seems to be manifest, firstly, in the rapid fall of temperature on the third day; and, secondly, in the fact that the subsequent rise did not attain a higher level than 102° .

Case 10.—Mary T——, an infant aged six months and a half, seen in consultation with Dr. Langston of Westminster. This is one of the two cases published four years ago. It proved a complicated one, through the occurrence of otitis and commencing meningitis, which was on two occasions relieved by puncture of the tympanic membranes performed by Mr. Field. In the early part of her illness she nearly succumbed to broncho-pneumonia. Leeches gave immediate relief to her cyanotic condition, but the temperature still stood at 105° , and the physical signs of consolidation over the root of the right lung were marked. After an ice-bag was applied the temperature fell in twenty-four hours to 101.4° . The bag was then removed, and the temperature rose to 103° , but fell again till it reached 100.4° . A sudden rise to 105.6° followed, and was accounted for by the discovery of a fresh patch of dulness over the root of the other (the left) lung. The ice-bag was applied to this new focus of inflammation, and at once a very rapid fall of temperature followed. In nine hours after the application of the ice it had fallen no less than 7° —from 105.6° to 98.8° ,—though the ice was

removed when it had fallen to 102° , and I noted that the new dull area was distinctly smaller than it had been in the morning. Three days later there was another rise to 106° , again accounted for by the discovery of a small fresh area of dulness behind the edge of the left scapula, the two areas already mentioned as previously consolidated being now both completely resonant. Again ice was applied to the new site of inflammation, and again there was a rapid fall to 102.4° , when the ice was removed. A transitory rise to 104° followed, and then a quick descent to 99° . The lung trouble was now practically at an end, but the temperature rose again owing to the otitis &c., which now began to manifest itself. In the long run the child recovered perfectly. A complete account of the case was published in the *Practitioner* for Aug., 1886.

D. CASES IN WHICH RAPID FALL OF TEMPERATURE FOLLOWED THE APPLICATION OF ICE, BUT RELAPSES (APPARENTLY DUE TO IMPLICATION OF FRESH PORTIONS OF LUNG) OCCURRED WHILE THE ICE WAS BEING CONTINUOUSLY APPLIED.

Case 11.—Emily B—, aged fifteen, was admitted into St. Mary's Hospital on Jan. 24th, 1885, with severe bronchopneumonia. This is the other case published in the *British Medical Journal*. She had been ill ten days before admission, and was found to have general bronchitis, with dulness over the whole front of the left lung, with a temperature of 104.2° . Poultices were applied to the chest. Next day she was worse, the temperature had risen to 105° , the physical signs were more marked, the pulse was 136, the respiration 44, and there was very considerable lividity of the lips and cheeks. Venesection to ten ounces was performed, and gave great immediate relief. The tempera-

ture fell one degree, but rose again as much in the evening, and next day was higher than ever, reaching 105.6° , the pulse then being 144, and the respiration 48. An ice-bag was now applied over the left front. Immediately the temperature fell precipitately, and next morning it was only 98° . In the afternoon, however, it rose again to 105.8° . On examination I found that the resonance over the left front, where the ice-bag had been applied, was remarkably improved, but fresh pneumonic crepitation and bronchial breathing had appeared in the axillary region. The ice-bag was shifted to this new focus, and again the temperature fell precipitately to 98° . It rose once more to 103° , and fell again to 98° . On the fourth day after the use of the ice was commenced there was a final rise to 104.2° , which proved to be due to implication of the apex of the opposite lung, there being now impaired resonance and harsh inspiration below the right clavicle. A second ice-bag was applied to this spot, and, to my surprise, twenty-four hours later I found the right apex perfectly normal. The temperature had fallen to 96.7° , and after this convalescence was uninterrupted. In this case the beneficial influence of the ice was quite indubitable, and the contrast shown by the temperature chart before and after its employment is most remarkable. The severity of the case was sufficiently demonstrated by the cyanosis, which necessitated recourse to venesection.

Case 12.—John S—, aged thirteen, was admitted into St. Mary's Hospital on Aug. 10th, 1888, on the fourth day of a pneumonia of the left base. His temperature was 105.8° . The house physician gave him five grains of quinine, and next morning his temperature was only 100.6° , but before 2 P.M. it rose again to 104.2° , when an ice-bag was applied over the inflamed lung. The rise continued until 6 P.M., when

105·4° was reached, but a rapid fall followed, and at 10 A.M. of the next (the sixth) day the temperature was only 100·2°. In spite, however, of the continued application of the ice, there was a rise in the afternoon to 103°, but this proved very temporary, and next morning (the seventh) 99° was again reached, and the ice-bag was removed. After this convalescence followed.

E. CASES IN WHICH NO IMMEDIATE ARREST OF THE PNEUMONIA FOLLOWED THE APPLICATION OF ICE, BUT OBVIOUS RELIEF TO SYMPTOMS RESULTED.

Case 13.—Minnie C——, aged twenty, admitted into St. Mary's Hospital on April 10th, 1888, on the seventh day of a pneumonia of the right base. Her temperature was 104·4°, and an ice-bag was at once applied. There was a fall of three degrees in the next few hours, but next morning the temperature was again 104°, in spite of the continued application of the ice, and it remained between 103° and 104° for three days. On the tenth day there came a sudden fall to 98°, and the ice was removed. On the eleventh day, however, it rose again to 102°, and the same happened on the twelfth day. Examination showed that the cause of this was the appearance of a small area of fresh inflammation at the base of the opposite lung. A second ice-bag was placed over this spot, and after this the temperature did not exceed 101°, and in three days more she was quite convalescent, the physical signs having disappeared. Here the ice-bag did not shorten the duration of the disease (unless, indeed, it may be credited with arresting an incipient attack on the previously healthy side), and it produced only temporary reduction of temperature, but the patient expressed herself as considerably relieved by it.

Case 14.—John L——, aged twenty-five, admitted into St. Mary's Hospital on July 9th, 1889, on the fourth day of a pneumonia affecting the apex of the right lung. I saw him on the fifth day and found his temperature $103\cdot6^{\circ}$, pulse 120, and respiration 48, with viscid rusty sputum. He had been delirious during the night, and was still semi-maniacal and very surly, resisting examination, talking wildly, and accusing us of attempting to poison him. The physical signs of pneumonia at the right apex were distinct. An ice-bag was applied at 2 P.M., and in spite of his curious mental condition he not object to it. A fall of temperature of two degrees and a half followed on the morning of the sixth day; but in a few hours $103\cdot6^{\circ}$ was again reached. It was noted, however, that his mental state was markedly improved. On the seventh day the temperature was still 103° , but the delirium had vanished, and the physical signs at the right apex were less distinct. On the eight day still further improvement was manifest, and the temperature stood at 102° in the morning and fell rapidly to 99° in the evening, when the ice was removed. After this the temperature was subnormal, and the patient convalescent. In this case improvement in the physical signs distinctly preceded the crisis.

Case 15.—Mary A——, aged twenty, admitted into St. Mary's Hospital on May 11th, 1889, on the fourth day of a pneumonia commencing at the right apex. She had a most unfavourable family history. She stated that her father suffered from asthma, that her mother had died of "galloping consumption," that she had lost ten brothers and sisters, and that of the three who survived two suffered from consumption. She had herself spat blood at times during the last two years. She also had suffered from "fits" for four years, and the onset of her pneumonia was marked by

a fit instead of a rigor. I saw her first on the fifth day of her illness, and found evidence of pneumonia at the right apex, with temperature 104° , pulse 128, and respiration 48. An ice-bag was applied over the affected apex at noon. At 6 o'clock the next morning the temperature had fallen four degrees, but in the course of the day it rose again to 102° . The pulse remained at 130, but the number of respirations had risen from 48 to 74, and some cyanosis had appeared. The upper part of the right lung both in front and behind was now dull, as far down as the angle of the scapula. On May 14th, the seventh day of her illness, the temperature was still only 102.5° , though the pulse was nearly 130, and the number of respirations had risen to 100. The right lung seemed now to be involved in its entire extent. Both cheeks were markedly cyanosed, and the sputum, which was scanty, very viscid, and a little aerated, was of exceedingly dark colour, almost black, the "prune-juice" expectoration of admittedly evil omen. A much larger ice-bag was now obtained, capable of surrounding the whole right chest, and this was applied at 5 P.M. Four ounces of brandy daily were ordered for her, and an ether and ammonia mixture every four hours. On the next day, the eighth, the temperature ranged about a degree lower (101.5°), the pulse remaining at 120, and the respiration still from 88 to 100. But it was observed that the sputum was distinctly less dark, and at the same time less viscid and more abundant. On the ninth day the temperature, pulse, and respiration remained about the same, but an extraordinary improvement had occurred in the physical signs. There was now very fair resonance over both back and front of the right lung down to the angle of the scapula, with large moist râles in front, and smaller râles with more natural

breathing behind. Below the angle of the scapula there was dulness, with fine moist râles, both inspiratory and expiratory. There was still further improvement in the appearance of the sputum. On the tenth morning I found that though the temperature had been even a little higher (103°) and was still 101° , and the pulse and respiration were respectively 120 and 86, the improvement in the physical signs was still more marked. My note was: "Very fair resonance behind, even to the base; some impairment in the axillary region from the posterior to the anterior axillary line. Over the front, resonance good as far as the nipple. Over the whole lung bubbling sounds can be heard, moderately loud, and of double rhythm. Cheeks bright-coloured." Between 6 o'clock and 10 that evening the temperature suddenly fell from 101° to 97° ; the crisis had arrived, and the ice-belt was removed. After this convalescence was complete. It must be allowed, I think, that in this case the ice was of the greatest service. It is hardly too much to say that it saved the patient's life. The condition on the seventh day, when the large ice-belt was applied, was most alarming. The entire right lung was consolidated, and the dyspnoea, the cyanosis, and the "prune-juice" expectoration indicated the gravity of the prognosis. Seventeen hours after its application a distinct improvement was observed in the sputum and in the hue of the cheeks. Next day a very extensive change for the better had occurred in the physical signs, and this improvement advanced rapidly. It had attained a most remarkable degree before the crisis occurred. It is surely uncommon in pneumonia for manifest improvement in physical signs to commence thirty-six hours before the crisis, and in this case it seemed certainly due to the local influence of the ice. The comparatively low range of the

temperature throughout (after the ice was applied) should also be noticed.

Case 16.—Harry D——, seven years old, an inmate of the Highgate Branch of the Children's Hospital, with a retracted right chest due to former empyema, the right lung being entirely collapsed (as was found on post-mortem examination some months later), was taken ill on June 22nd, 1887. I saw him next day, and found his temperature 104° , pulse 160, respiration 56. Feeling sure, though I could not prove, that pneumonia of the left, the only working, lung was commencing, I had an ice-bag at once applied over it. The temperature fell four degrees before the next morning, but gradually rose again, not attaining the same height, however, for forty-eight hours. On the third day of his illness I detected a small area of dulness over the root of the left lung, and at this spot bronchial breathing. He complained of pain at the epigastrium, and I noticed that his lips and cheeks were already livid. This was not surprising, for his other lung was useless. The prognosis was evidently most grave, and might even have been looked upon as hopeless. Next day, the fourth, the dulness was more extensive, being now four fingers' breadth in diameter, and albuminuria was present, but the complexion was not more blue than yesterday, and the boy seemed a little stronger. The icebag had been persistently applied. Pulse 160, respiration 60. On the fifth day the dulness was decidedly less, measuring now only two fingers' breadth, and the temperature was lower, ranging at about 102° ; pulse 152, respiration 58. Epigastric pain continued. The sixth day resembled the fifth. On the seventh day the temperature fell to normal, and the ice-bag was removed. Pleuritic friction could now be heard over the dull area and below it. The pleurisy kept his temperature a little raised for a few

days, but it gradually subsided without effusion of fluid, and the boy returned to his condition before the pneumonia. By-and-by he was able to go home, but three months later he came back to Great Ormond-street, and died there from cardiac failure. Post-mortem examination showed that the right lung was completely collapsed, the right side of the heart greatly dilated, and the tricuspid valve incompetent, the left auricle and ventricle and mitral valve being normal. The left lung was very voluminous ; it was healthy except for some very old cretaceous and calcified tubercle at its apex ; there were comparatively recent pleuritic adhesions over the left lower lobe. In this case it is hardly possible to doubt that the icebag saved the boy's life, in a condition otherwise hopeless.

**F. CASES IN WHICH NO VERY OBVIOUS BENEFIT RESULTED
FROM THE USE OF THE ICE-BAG.**

Case 17.—James R——, aged five, was admitted into St. Mary's Hospital on July 8th, 1887, on the third day of his illness. Next day his temperature was 104°, pulse 150, respiration 50. No signs of pneumonia, however, could be discovered until the sixth day, when the upper lobe of his right lung became consolidated. An ice-bag was applied and kept on until the crisis, which occurred on the eighth day. It was not clear that in this case any distinct benefit followed from its use.

Case 18.—Edward S——, aged about forty, was admitted into St. Mary's Hospital on June 28th, 1887, on the second day of his illness. He was found to have a limited pleuro-pneumonia at the right base, and also an area of dry pleurisy at his left base. It was noticed that the heart's action was very feeble. Temperature 104°, pulse 120, respiration 32. An ice-bag was applied to the right base,

but at the same time whisky was ordered, and its amount was increased from four ounces on the third day to six ounces on the fourth day and to nine ounces on the fifth. It was difficult to say whether the ice-bag did good, though the range of temperature was a little reduced, but it certainly did no harm, in spite of the great cardiac weakness and the consequent necessity for free stimulation. On the evening of the fifth day came the crisis; the ice-bag was discontinued and the whisky was gradually reduced. Satisfactory convalescence followed.

The above is a complete list of the cases treated by the ice-bag, of which I have notes, though in two or three other cases seen in consultation I have recommended its use, and improvement has followed and apparently been caused by it. Reviewing the eighteen cases narrated, I may point out, in the first place, that none of them died. Many of the cases, indeed, were comparatively slight, and most of them occurred in children or young adults, in whom the prognosis of lobar pneumonia is usually good, however alarming the symptoms may appear to be. At least two, however (Cases 15 and 16, both of lobar pneumonia), would, I think, have certainly died but for the ice-bag, and two more (Cases 10 and 11, both of broncho-pneumonia) would almost certainly have done so.

In the great majority of cases remarkable improvement followed the application of the ice. The reduction of temperature which usually occurred at once was often very striking. Instead of the "entire degree" spoken of by Niemeyer as resulting from the use of cold compresses, it frequently amounted to three or four degrees, sometimes even more; on one occasion even to seven degrees. If a subsequent rise occurred it was usually to a decidedly lower level when the ice had been permanently applied, and

though when the ice had been removed the subsequent rise often passed the original height, it was again rapidly reduced by a second application. These results were especially observed in children, perhaps partly because their temperature is more easily affected than is that of adults, and partly because the icebag covered a larger proportion of their smaller chest wall. But the improvement was not confined to a mere reduction of temperature. In many cases I noticed a striking arrest in the development of the physical signs, and also of the general symptoms of the disease ; and it is particularly to be observed that in some instances this improvement began an entire day or more before the crisis, and was far advanced when that event occurred. This was very remarkable in each of the two gravest cases (Cases 15 and 16). Occasionally, in slight cases, the application of the ice was followed by immediate complete abolition of the disease ; but this is obviously open to the fallacy that the crisis may have already arrived, and I therefore lay no stress on this. But, in the two cases of broncho-pneumonia seen in young children in their very earliest stage, it certainly seemed that the disease was promptly cut short. I have never seen any harm follow from the employment of the ice-bag in pneumonia. In one case, indeed, the notes of which have been unfortunately lost—that of a boy of seven years old, with a pneumonia of the right apex, accompanied by a pericardial rub,—so rapid a reduction of temperature followed the use of the ice that the child shivered and was cold, and the house physician felt it necessary to stimulate him. But when I saw him the next morning he was very lively. In a case of pyrexia, however, recently under my care, in which the diagnosis was doubtful until a typhoid rash appeared, and in which an ice-bag was applied to the left lung on the hypothesis that the cause

might be a latent pneumonia (the patient being a boy of about six), distinct collapse was produced by the cold applications. The temperature fell to below normal, the boy complained of cold, became bluish, and shivered. The symptoms were easily removed by warmth and brandy. Similar effects may no doubt be produced in pneumonia by the incautious use of ice. They are the more likely to happen the younger the patient, and they are probably more easily produced in cases of broncho-pneumonia, especially in feeble and rickety children, than in cases of true lobar pneumonia. That they need not necessarily occur, however, is manifest from Case 10, which was one of broncho-pneumonia in an infant of only six months and a half. Their occurrence may, I think, almost always be prevented by a sufficiently careful observation of the temperature. I usually direct, at all events in the case of young children, that the temperature shall be taken every hour, and the ice-bag removed when the thermometer indicates 100° , and replaced if a rise to 102° follows. In some cases it is wise to apply warmth to the feet or even to the abdomen at the same time that the ice-bag is applied over the inflamed lung, and the internal administration of brandy may then also be of service. With these precautions it is often possible to use the ice-bag even in debilitated patients without harm. It will be well, however, to draw attention to another point. Dr. Lauder Brunton has suggested to me that the occurrence of collapse may sometimes be due to the direct action of the cold upon the heart, and I have seen him perform an experiment on the excised heart of the frog which illustrates this. A frog is pithed, and the heart rapidly cut out and isolated. It continues to beat regularly. If now it be chilled by the application of ice, the pulsation diminishes until it entirely stops. If the ice be removed and

gentle warmth substituted, the pulsations recommence and soon regain their former rate and vigour. This alternation can be repeated two or three times. The experiment clearly shows the depressing influence of cold on the action of the heart, and it is no doubt wise to bear this in mind, and see to it that the ice-bag is not placed over the præcordial region. But I do not advocate the employment of this treatment in pneumonia in very feeble children, in the aged, or in adynamic conditions generally.

My conclusion is, that there is reason to believe that the ice-bag applied over a pneumonic lung has a directly curative influence, that it does not simply reduce the general temperature, but that it distinctly tends to repress the inflammatory process in the lung, with more or less success according to the severity of the case, and the height which the inflammation has already reached. This is true, whatever theory of the causation of the disease be adopted. Coccus or no coccus, the ice-bag benefits an ordinary pneumonia. Whether its action is beneficial in the epidemic and "pythogenic" forms of the malady I cannot say, having no experience of these. I will only add, as confirmatory evidence, that some months ago my colleague, Dr. Angel Money, published a note in one of the medical journals recommending the use of the ice-bag in the pneumonia of children, and that in *THE LANCET* of Aug. 10th of this year there is a statement that Dr. Fieandt, a Finnish medical man, "has treated no less than 106 cases of pneumonia with ice, and with the best results. Though ten of the cases were of double pneumonia, only three out of the whole number succumbed, notwithstanding that the epidemic was by no means a slight one." Thus the mortality was only 3 per cent. With this may be contrasted some figures given in the same journal on July 27th of this year, in which it is stated that

“in the 1000 cases of acute lobar pneumonia treated at the Massachusetts General Hospital from 1822 to the present time, there was a mortality of 25 per cent. ;” and the authors add that “treatment has not influenced the mortality rate nor the duration of the disease or of its convalescence.” If this rate of mortality had prevailed among my eighteen cases I should have lost four of them, and four is precisely the number which, as I have already shown, were almost certainly saved by the ice-bag.